

VUV Storage Ring Parameters

as of January 2004

Normal Operating Energy	0.808 GeV
Peak Operating Current (multibunch ops.)	1.0 amp ($1.06 \times 10^{12} e^-$)
Circumference	51.0 meters
Number of Beam Ports on Dipoles	18
Number of Insertion Devices	2
Maximum Length of Insertion Devices	~ 2.25 meters
$\lambda_c(E_c)$	19.9 Å (622 eV)
$B(p)$	1.41 Tesla (1.91 meters)
Electron Orbital Period	170.2 nanoseconds
Damping Times	$\tau_x = \tau_y = 13$ msec; $\tau_e = 7$ msec
Lifetime @ 200 mA with 52 MHz (with 211 MHz Bunch Lengthening)	360 min (590 min)
Lattice Structure (Chasman-Green)	Separated Function, Quad, Doublets
Number of Superperiods	4
Magnet Complement	{ 8 Bending (1.5 meters each) 24 Quadrupole (0.3 meters each) 12 Sextupole (0.2 meters each)
Nominal Tunes (v_x, v_y)	3.14, 1.26
Momentum Compaction	0.0235
RF Frequency	52.887 MHz
Radiated Power	20.4 kW/amp of Beam
RF Peak Voltage with 52 MHz (with 211 MHz)	80 kV (20kV)
Design RF Power with 52 MHz (with 211 MHz)	50 kW (10 kW)
Synchrotron Tune (v_s)	0.0018
Natural Energy Spread (σ_e/E)	5.0×10^{-4} , $I_b < 20$ mA
Bunch Length (2σ)	9.7 cm ($I_b < 20$ mA) (36 cm)
($2L_{rms}$ with 211 MHz Bunch Lengthening)	9
Number of RF Buckets	7
Typical Bunch Mode	160 nm-rad
Horizontal Damped Emittance (ε_x)	≥ 0.35 nm-rad (4nm-rad in normal ops.)*
Vertical Damped Emittance (ε_y)	3.2 Watts
Power per Horizontal Milliradian (@ 1A)	

Arc Source Parameters

Betatron Function (β_x, β_y)	1.18 to 2.25 m, 10.26 to 14.21 m
Dispersion Function (η_x, η'_x)	0.500 to 0.062 m, 0.743 to 0.093 m
$\alpha_{x,y} = -\beta'_{x,y}/2$	-0.046 to 1.087, 3.18 to -0.96
$\gamma_{x,y} = (1 + \alpha_{x,y}^2)/\beta_{x,y}$	0.738 to 0.970 m ⁻¹ , 1.083 to 0.135 m ⁻¹
Source Size (σ_x, σ_y)	536 to 568 μm, >60 to >70 μm (170-200 μm in normal ops.)*
Source Divergence (σ'_x, σ'_y)	686 to 373 μrad, 19.5 to 6.9 μrad (55-20 μrad in normal ops.)*

Insertion Device Parameters

Betatron Function μm (β_x, β_y)	11.1 m, 5.84 m
Source Size (σ_x, σ_y)	1240 μm, >45 μm (220 μm in normal ops.)*
Source Divergence (σ'_x, σ'_y)	112 μrad, >7.7 μrad (22 μrad in normal ops.)*

* ε_y is adjustable